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EXAMINER

KIBLER, VIRGINIA M

ART UNIT	PAPER NUMBER
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2623

12

DATE MAILED: 03/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/445,304

Applicant(s)

FUJIEDA, SHIRO

Examiner

Virginia M Kibler

Art Unit

2623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 January 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7,11.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment received on January 13, 2003 has been entered. Claims 1-46 remain pending. In light of the amendment, the previous objections to the abstract, specification, and claim 1 are withdrawn.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 31, 35, and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsukasaki (JP A 8-272980).

Regarding claim 1, Tsukasaki discloses a gradient calculation means for calculating at least the direction of the level gradient of a processing unit in a given image data including a plurality of pixels (Abstract, lines 3-9), the pixels having level data as shown in Figure 35. Tsukasaki further discloses a register in the direction of the edge is turned on (Reasons for Refusal, page 2, lines 14-19) corresponding to a line segment formation means for producing line segment image data representing a line segment having a given length and a direction corresponding to the direction of the level gradient which is calculated by the gradient calculation means and line segment image storage means.

Regarding claim 31, the arguments analogous to those presented above for claim 1 are applicable to claim 31. Note that Tsukasaki discloses a register in the direction of the edge is

turned on, thereby producing a line segment image corresponding to the calculated direction of the level gradient for each pixel having a non-zero level gradient.

Regarding claim 35, Tsukasaki discloses a means for extracting a plurality of edges (Abstract, lines 3-4), means for setting a line segment extending a predetermined length in a direction corresponding to the direction of the extracted edge whose level gradients are not less than a predetermined value in a given image (Figure 35), and a means for detecting the presence or absence of a point of intersection of a plurality of line segments and the position thereof (Figure 50).

Regarding claim 36, Tsukasaki discloses the direction of the line segment is a direction perpendicular to the direction of the edge (Figure 39).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukasaki (JP A 8-272980).

Claim 32 is drawn to a medium storing program for controlling a computer to calculate the direction of the gradient, produce line segment image data, and store the line segment, which corresponds to claim 1. The arguments analogous to those presented above for claim 1 are applicable to claim 32. While Tsukasaki does not appear to explicitly mention a medium storing program, this would have been clearly obvious to one of ordinary skill in the art at the time of the

invention to have modified the image processing method disclosed by Tsukasaki to include a medium storing a program that performs the method in order to establish his system as being or relating to a computer based system.

6. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukasaki (JP A 8-272980) as applied to claim 1 above, and further in view of Moler (5,142,592).

Regarding claim 43, Tsukasaki does not appear to disclose the direction of the level gradient as a direction of a composite vector having a level gradient along the x-axis and a vector having a level gradient along the y-axis. However, Moler teaches that it is known to determine the direction of the level gradient by using the direction of the composite vector (Col. 4, lines 65-68 and Col. 5, lines 1-10). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the gradient calculation means disclosed by Tsukasaki to include the composite vector as taught by Moler as a design choice.

7. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukasaki (JP A 8-272980) as applied to claim 35 above, and further in view of Moler (5,142,592).

Regarding claim 45, the arguments analogous to those presented above for claim 43 are applicable to claim 45.

8. Claims 2, 5, 10, and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukasaki (JP A 8-272980) as applied to claim 1 above, and further in view of Lin et al. (6,292,582).

Regarding claim 2, Tsukasaki does not appear to explicitly state including an image storage means for storing the given image data. However, Lin et al. ("Lin") teaches that it is known to include means for storing the image data in an image processing apparatus (Col. 5,

lines 63-64). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the image processing apparatus disclosed by Tsukasaki to merely state including an image storage means for storing the given image data, as taught by Lin, in order to save the image data.

Regarding claim 5, Lin discloses producing image data at a gray level (Col. 13, line 15).

Regarding claim 10, Lin discloses a storage means that appends or “adds” new image data to data already stored at each of the pixels (Col. 15, lines 59-62).

Regarding claim 19, Lin discloses an image input means having a camera for producing image data and feeding the data to a gradient calculation means (Col. 6, line 36).

Regarding claim 20, Lin discloses displaying the results 704 (Figure 41c). Lin also discloses a line segment image as shown in Figure 7. Lin does not expressly recognize the need to display the line segment image. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the display means and line segment image as disclosed by Lin to display a line segment image represented by the line segment image data in order to illustrate the results of the line segment formation.

Regarding claim 21, Lin discloses displaying the results 704 (Figure 41c). Lin also discloses an image represented by the given image data aligned or “overlapped” with the line segment image as shown in Figure 30a (Col. 26, lines 39-41). Lin does not expressly recognize the need to display the image. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the display means and the image represented by the given image data overlapped with the line segment image to display an image represented by

the given image data overlapped with the line segment image in order to compare the results of line segment formation with the given image data.

Regarding claim 22, Lin discloses displaying the results 704 (Figure 41c). Lin discloses a means for extracting an edge of the image represented by the given image data as shown in Figure 20a. Lin also discloses a line segment image (Figure 7). Lin does not expressly recognize the need to display the image represented by the extracted edge overlapped with the line segment image. However, Lin teaches that it is known to superimpose one image over that of a second image (Col. 14, lines 30-31). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the display means, the extracted edge image, and the line segment image as disclosed by Lin to display an image represented by the extracted edge overlapped with the line segment image in order to compare the results.

9. Claims 28-30, 33, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukasaki (JP A 8-272980) in view of Lin et al. (6,292,582).

Regarding claim 28, the arguments analogous to those presented above for claims 31 and 20 are applicable to claim 28.

Regarding claim 29, the arguments analogous to those presented above for claim 21 are applicable to claim 29.

Regarding claim 30, the arguments analogous to those presented above for claim 22 are applicable to claim 30.

Regarding claim 33, the arguments analogous to those presented above for claim 28 are applicable to claim 33.

Regarding claim 34, the arguments analogous to those presented above for claim 28 and 32 are applicable to claim 34.

10. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukasaki (JP A 8-272980) in view of Lin et al. (6,292,582) as applied to claim 28 above, and further in view of Moler (5,142,592).

Regarding claim 44, the arguments analogous to those presented above for claim 43 are applicable to claim 44.

11. Claims 3, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukasaki (JP A 8-272980) as applied to claim 1 above, and further in view of Alves et al. (5,093,869).

Regarding claim 3, Tsukasaki does not appear to explicitly state an image data extraction means for extracting image data in a processing region set in input image data and feeding the extracted image data to the gradient calculation means. However, Alves et al. ("Alves") teaches that it is known to use an image data extraction means. The low level feature detector 11 extracts the image data in a processing region set in input image data (Col. 3, lines 4-10). The low level feature detector also performs the gradient calculation means (Col. 3, lines 43-45), thereby, the extracted image data is fed to the gradient calculation means. Therefore, it would have been obvious to one of ordinary skill in the art at time of the invention to have modified the gradient calculation means disclosed by Tsukasaki to expressly state an image data extraction means, as taught by Alves, in order to determine the direction of the level gradient.

Regarding claim 7, Alves discloses a gradient calculation means that calculates the magnitude (Col. 3, line 44) of the level gradient as well as the direction (Col. 5, lines 41-53) for the level gradient.

Regarding claim 8, arguments analogous to those presented above for claim 7 are applicable to claim 8. Alves also discloses a line segment formation means that produces line segment image data having a level corresponding to the intensity or “magnitude” of the level gradient which is calculated by the gradient calculation means (Col. 4, lines 26-27).

12. Claims 4, 9, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukasaki (JP A 8-272980) as applied to claim 1 above, and further in view of Alves et al. (5,093,869) and Lin et al. (6,292,582).

Regarding claim 4, Tsukasaki and Alves do not disclose a means for setting. However, Lin discloses a means for setting the processing region. The decomposition window 98 or the “processing region” may have a default search pattern (Col. 10, lines 10-11). The search pattern of the processing region may be set by programming (Col. 10, lines 54-56). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the processing region disclosed by Tsukasaki and Alves to include a means for setting as taught by Lin, in order to provide the user the ability to determine the processing region.

Regarding claim 9, arguments analogous to those presented above for claim 7 are applicable to claim 9. Alves does not recognize the need for producing line segment image data only when the magnitude of the level gradient is not less than a predetermined threshold. However, Lin teaches considering only segments greater or “not less than” a predetermined gradient threshold (Col. 10, lines 35-39). Therefore, it would have been obvious to one of

ordinary skill in the art at the time of the invention to have modified the line segment formation means disclosed by Alves to include a predetermined threshold, as taught by Lin, in order to avoid false detections.

Regarding claim 16, Alves discloses a means for analyzing or “detecting” a portion where line segments are concentrated (Col. 5, lines 46-49). Alves does not recognize storing the line segment image data. However, Lin et al. (“Lin”) teaches that it is known to include line segment image storage means for storing the line segment image data (Col. 11, lines 1-3). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the means for detecting as disclosed by Alves to have included line segment image storage means, as taught by Lin, in order to store the locations of the line segments.

13. Claims 37-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukasaki (JP A 8-272980) in view of Alves et al. (5,093,869) in further view of Lin et al. (6,292,582).

Regarding claim 37, the arguments analogous to those presented above for claims 1 and 16 are applicable to claim 37. Alves discloses an image input means 9 for inputting image data representing an inspection object (Figure 1).

Regarding claim 38, the arguments analogous to those presented above for claim 1 are applicable to claim 38. Note that the direction corresponding to the direction of the level gradient is the direction of the level gradient.

Regarding claim 39, the arguments analogous to those presented above for claim 20 are applicable to claim 39.

Regarding claim 40, the arguments analogous to those presented above for claim 21 are applicable to claim 40.

14. Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukasaki (JP A 8-272980) in view of Alves et al. (5,093,869) in further view of Lin et al. (6,292,582) as applied to claim 37 above, and further in view of Moler (5,142,592).

Regarding claim 46, the arguments analogous to those presented above for claim 43 are applicable to claim 46.

15. Claims 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukasaki (JP A 8-272980) as applied to claim 1 above, and further in view of Tachibana (5,898,440).

Regarding claim 11, the arguments analogous to those presented above for claim 1 are applicable to claim 11. Tsukasaki does not recognize storing new line segment image data without subjecting the line segment image data to addition processing. However, Tachibana teaches that it is known to store new line segment data without subjecting the line segment image data to addition processing (Col. 5, lines 7-17). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the image storage means as disclosed by Tsukasaki to store new line segment image data without subjecting the line segment image data to addition processing, as taught by Tachibana, in order to store the data.

Regarding claims 12 and 13, Tachibana teaches that it is known to have a line segment formation means that produces a line with given parameters (Col. 5, line 7). It would have been obvious to one of ordinary skill in the art at the time of the invention to have specified the parameters received by the line segment formation means to include a predetermined length and

a distance from the processing unit to an initial point and a terminal point in order to form line segments of a specified length.

Regarding claims 14 and 15, the arguments analogous to those presented above for claims 12 and 13 are applicable to claims 14 and 15. Note that allowing for given parameters (Col. 5, line 7) is a means for setting.

16. Claims 17, 18, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukasaki (JP A 8-272980) as applied to claim 1 above, and further in view of King et al. (5,929,557).

Regarding claim 17, Tsukasaki discloses an image processing apparatus that has line segment image data stored in a line segment image storage means. Tsukasaki does not recognize the need for detecting the position of the pixel having the maximum of the levels of the line segment image data. However, King et al. ("King") teaches a means for detecting the position of the pixel having the maximum gradient (Col. 11, lines 2-7). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the image apparatus as disclosed by Tsukasaki to use the means for detecting the position of the pixel having the maximum gradient, as taught by King, in order to detect the position of the pixel having the maximum of the levels of the line segment image data stored in the line segment image storage means.

Regarding claim 18, King discloses a means for judging whether or not the maximum level exceeds a predetermined threshold (Figure 9, element 320).

Regarding claim 24, the arguments analogous to those presented above for claims 17 and 22 are applicable to claim 24. King indicates the pixel that has the maximum level with a mark

as shown in Figure 6 by elements 76a-76d. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have displayed the mark indicating the pixel with the maximum level as disclosed by King superimposed or “overlapped” with the image, as taught by Tsukasaki, in order to clearly illustrate the mark.

Regarding claim 25, the arguments analogous to those presented above for claims 18 and 24 are applicable to claim 25.

17. Claims 23, 26, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukasaki (JP A 8-272980) as applied to claim 1 above, and further in view of Alves et al. (5,093,869), Lin et al. (6,292,582), and King et al. (5,929,557).

Regarding claim 23, the arguments analogous to those presented above for claims 16 and 22 are applicable to claim 23. Alves does not recognize displaying a mark representing the portion where the line segments are concentrated overlapped with the image represented by the image data. Note that as stated above for claim 24, King teaches that it is known to place a mark to indicate a position. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the means for detecting a portion where line segments are concentrated as disclosed by Alves and placed a mark, as taught by King, in order to indicate the position and to display the mark superimposed or “overlapped” with the image, as taught by Lin, in order to clearly visualize the portion.

Regarding claim 26, Lin discloses displaying the results 704 (Figure 41c). Lin discloses a means for extracting an edge of the image represented by the given image data as shown in Figure 20a. Lin does not expressly recognize the need to display the image represented by the extracted edge overlapped with the image data. However, Lin teaches that it is known to

superimpose one image over that of a second image (Col. 14, lines 30-31). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the display means, the extracted edge image, and the image data as disclosed by Lin to display an image represented by the edge extracted in addition to or in place of the image represented by the image data in order to view the results of the edge extraction.

Regarding claim 27, the arguments analogous to those presented above for claim 22 are applicable to claim 27.

18. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukasaki (JP A 8-272980) in view of Alves et al. (5,093,869) in further view of Lin et al. (6,292,582) as applied to claim 37 above, and further in view of King et al. (5,929,557).

Regarding claim 41, the arguments analogous to those presented above for claim 23 are applicable to claim 41.

19. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukasaki (JP A 8-272980) in view of Alves et al. (5,093,869) in further view of Lin et al. (6,292,582) as applied to claim 37 above, and further in view of Tachibana (5,898,440).

Regarding claim 42, the arguments analogous to those presented above for claims 14 and 15 are applicable to claim 42.

20. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukasaki (JP A 8-272980) as applied to claim 1 above, and further in view of Williams et al. (6,427,030)

Regarding claim 6, Tsukasaki does not appear to recognize producing line segment image data at a binary level. However, Williams et al. ("Williams") teaches that it is known to convert gray level pixel image data to binary level pixel image data (Col. 1, lines 30-34).

Therefore, it would have been obvious to one of ordinary skill to have modified the line segment formation means as disclosed by Tsukasaki to produce line segment image data at a binary level, as taught by Williams, in order to reduce the multi-level gray image data to a limited number of levels so that it is printable (Col. 1, lines 26-28).


Contact Information

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Virginia M Kibler whose telephone number is (703) 306-4072. The examiner can normally be reached on Mon. - Thurs. 8:00 - 5:30 and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

VK
March 24, 2003


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